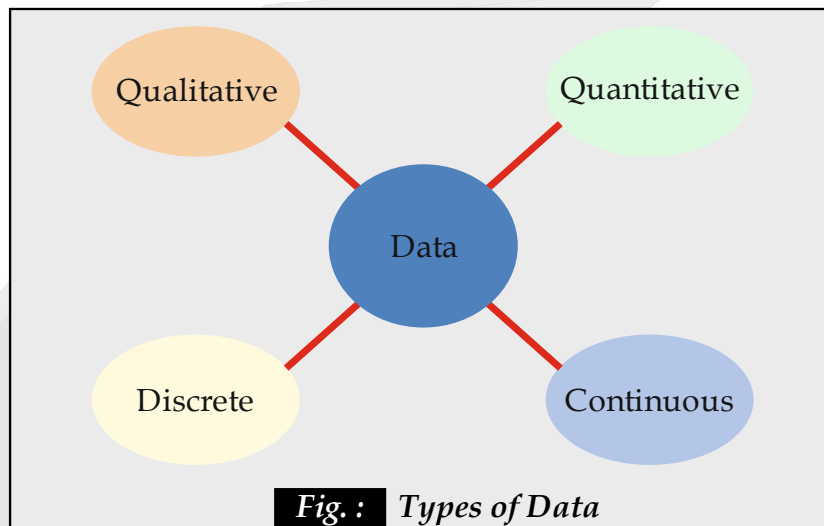


2. Data

“The facts and figures which can be numerically measured are studied in statistics. Numerical measures of same characteristic are known as observation and collection of observations is termed as data.” Data are collected by individual research workers or by organization through sample surveys or experiments, keeping in view the objectives of the study.

Types of Data

Data may be qualitative or quantitative. Once know the difference between them, can know how to use them.



- **Qualitative Data :** They represent some characteristics or attributes. They depict descriptions that may be observed but cannot be computed or calculated. For example, data on attributes such as intelligence, honesty, wisdom, cleanliness, and creativity collected using the students of your class a sample would be classified as qualitative. They are more exploratory than conclusive in nature.
- **Quantitative Data :** These can be measured and not simply observed. They can be numerically represented and calculations can be performed on them. For example, data on the number of students playing different sports from your class gives an estimate of how many of the total students play which sport. This information is numerical and can be classified as quantitative.
- **Discrete Data :** These are data that can take only certain specific values rather than a range of values. For example, data on the blood group of a certain population or on their genders is termed as discrete data. A usual way to represent this is using bar charts.
- **Continuous Data :** These are data that can take values between a certain range with highest and lowest values. The difference between the highest and lowest value is called **the range of data**. For example, the age of persons can take values even in decimals or so is the case of the height and weights of the students of school. These are classified as continuous data. Continuous data can be tabulated in what is called a frequency distribution. They can be graphically represented using histograms.

Sources of The Data

Data required for Management research can be classified into primary data and secondary data.

(i) Primary Data

Primary data is the data specially collected in a research by the researcher and his agent. These are products of experiments, survey, interview or observation conducted in the research. It is collected fresh and for the first time and thus appear to be original character.

Survey : Survey method is one of the primary sources of data which is used to collect quantitative information about items in a population. Surveys are used in different areas for collecting the data even in public and private sectors. A survey may be conducted in the field by the researcher. The respondents are contacted by the research person personally, telephonically or through mail. This method takes a lot of time, efforts and money but the data collected are of high accuracy, current and relevant to the topic. When the questions are administered by a researcher, the survey is called a structured interview or a researcher administered survey.

Observations : Observation as one of the primary sources of data. Observation is a technique for obtaining information involves measuring variables or gathering of data necessary for measuring the variable under investigation. Observation is defined as accurate watching and noting of phenomena as they occur in nature with regards to cause and effect relation.

Interview : Interviewing is a technique that is primarily used to gain an understanding of the underlying reasons and motivations for people's attitudes, preferences or behavior. Interviews can be undertaken on a personal one-to-one basis or in a group.

Questionnaires : Questionnaire as one of the primary sources of data is an observational technique which comprises series of items presented to a respondent in a written form, in which the individual is expected to respond in writing. Here the respondents are given list of written items which he responds to by ticking the one he considers appropriate.

Advantages of Primary Data

- The primary data are original and relevant to the topic of the research study so the degree of accuracy is very high.
- Primary data is that it can be collected from a number of ways like interviews, telephone Surveys, focus groups etc. It can be also collected across the national borders through emails and posts. It can include a large population and wide geographical coverage.
- Moreover, primary data is current and it can better give a realistic view to the researcher about the topic under consideration.
- Reliability of primary data is very high because these are collected by the concerned and reliable party.

Disadvantages of Primary Data

- For collection of primary data where interview is to be conducted the coverage is limited and for wider coverage a more number of researchers are required.
- A lot of time and efforts are required for data collection. By the time the data collected, analysed and reported for the problem of the research becomes very serious or out dated. So the purpose of the research may be defeated.
- It has design problems like how to design the surveys. The questions must be simple to understand and respond.

- Some respondents do not give timely responses. Sometimes, the respondents may give fake, socially acceptable and sweet answers and try to cover up the realities.
- With more people, time and efforts involvement the cost of the data collection goes high. The importance of the research may go down
- In some primary data collection methods there is no control over the data collection. Incomplete questionnaire always gives a negative impact on research.
- Trained persons are required for data collection. Inexperienced person in data collection may give inadequate data of the research.

(ii) Secondary Data

Secondary data is the data collected by other researcher for their own use and which is of the use to another research project. Secondary data are those which have already been collected by someone else and which have already been passed through the statistical process. A variety of secondary information sources is available to the researcher gathering data on an industry, potential product applications and the market place.

The secondary data can be obtained through :

1. **Internal Sources** : These are within the organization.
2. **External Sources** : These are outside the organization.

Internal Sources of Data :

If available, internal secondary data may be obtained with less time, effort and money than the external secondary data. In addition, they may also be more pertinent to the situation at hand since they are from within the organization. The internal sources include

1. **Accounting Resources** : This gives so much information which can be used by the marketing researcher. They give information about internal factors.
2. **Sales Force Report** : It gives information about the sale of a product. The information provided is of outside the organization.
3. **Internal Experts** : These are people who are heading the various departments. They can give an idea of how a particular thing is working.
4. **Miscellaneous Reports** : These are what information you are getting from operational reports.

External Sources of Data

External Sources are sources which are outside the company in a larger environment. Collection of external data is more difficult because the data have much greater variety and the sources are much more numerous.

External data can be divided into following classes :

(a) Government Publications : Government sources provide an extremely rich pool of data for the researchers. In addition, many of these data are available free of cost on internet websites. There are number of government agencies generating data. These are :

- (i) **Registrar General of India** : It is an office which generate demographic data. It includes details of gender, age, occupation etc.
- (ii) **Central Statistical Organization** : This organization publishes the national accounts statistics. It contains estimates of national income for several years, growth rate, and rate of major economic activities.

- (iii) **Director General of Commercial Intelligence** : This office operates from Kolkata. It gives information about foreign trade i.e. import and export. These figures are provided region-wise and country-wise.
- (iv) **Ministry of Commerce and Industries** : This ministry through the office of economic advisor provides information on wholesale price index. These indices may be related to a number of sectors like food, fuel, power, food grains etc. It also generates All India Consumer Price Index numbers for industrial workers, urban, non- manual employees and cultural labourers.
- (v) **Planning Commission** : It provides the basic statistics of Indian Economy.
- (vi) **Reserve Bank of India** : This provides information on Banking Savings and investment. RBI also prepares currency and finance reports.
- (vii) **Labour Bureau** : It provides information on skilled, unskilled, white collared jobs etc.
- (viii) **National Sample Survey** : This is done by the Ministry of Planning and it provides social, economic, demographic, industrial and agricultural statistics.
- (ix) **Department of Economic Affairs** : It conducts economic survey and it also generates information on income, consumption, expenditure, investment, savings and foreign trade.
- (x) **State Statistical Abstract** : This gives information on various types of activities related to the state like - commercial activities, education, occupation etc.

(b) **Non-Government Publications** : These includes publications of various industrial and trade associations, such as

- (i) The Indian Cotton Mill Association
- (ii) Various chambers of commerce
- (iii) The Bombay Stock Exchange (it publishes a directory containing financial accounts, key profitability and other relevant matter)
- (iv) Various Associations of Press Media.
- (v) Export Promotion Council.
- (vi) Confederation of Indian Industries (CII)
- (vii) Small Industries Development Board of India
- (viii) Different Mills like - Woolen mills, Textile mills etc.

(c) **Syndicate Services** : These services are provided by certain organizations which collect and tabulate the marketing information on a regular basis for several clients who are the subscribers to these services. So the services are designed in such a way that the information suits the subscriber. These services are useful in television viewing, movement of consumer goods etc. and syndicate services provide information data from both household as well as institution.

Advantages of Secondary Data

- The primary advantage of secondary data is that it is cheaper and faster to access.
- It provides a way to access the work of the best scholars all over the world.
- Secondary data gives a frame of mind to the researcher that in which direction he/she should go for the specific research.
- Secondary data save time, efforts and money and add to the value of the research study.

Disadvantages of Secondary Data

- The data collected by the third party may not be a reliable party so the reliability and accuracy of data go down.
- Data collected in one location may not be suitable for the other one due variable environmental factor.
- With the passage of time the data becomes obsolete and very old
- Secondary data collected can distort the results of the research. For using secondary data a special care is required to amend or modify for use.
- Secondary data can also raise issues of authenticity and copyright.

Analysis of Interpretation of Data

Data analysis is considered to be important step and heart of the research in research work. After collection of data with the help of relevant tools and techniques, the next logical step, is to analyze and interpret data with a view to arrive at empirical solution to the problem.

The data analysis for the present research was done quantitatively with the help of both descriptive statistics and inferential statistics. The descriptive statistical techniques like mean, standard deviation and for the inferential statistics Analysis of Co-variance were used during data analysis. For the analysis of Chi square test was used.

Once data received from the field the research has an important duty to prepare data for subsequent analysis for this the researcher has to edit the data for designing possible error in reporting.

The data preparation consists of three important steps :

1. Editing
2. Coding
3. Cleaning
4. Data Entry

Analysis Major Objectives

- Evaluate and enhance data quality.
- Describe the study population and its relationship to some presumed source (account for all in-scope potential subjects; compare the available study population with the target population)
- Assess potential for bias (e.g., non-response, refusal, and attrition, comparison groups)
- Estimate measures of frequency and extent (prevalence, incidence, means, medians)
- Estimate measures of strength of association or effect
- Assess the degree of uncertainty from random noise ("chance")
- Control and examine effects of other relevant factors
- Seek further insight into the relationships observed or not observed
- Evaluate impact or importance

Representation of Data

The process of data collection and the methods applied for analyzing and interpreting the data collected through various tools were described and discussed at length.

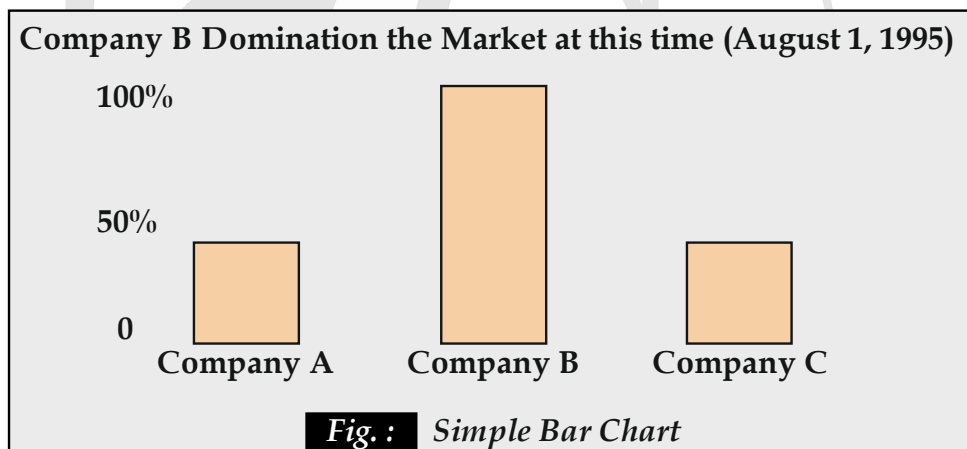
In report the most of selecting and representation data in form of

- Bar Chart
- Multi- Range Bar Chart
- Stacked Bar Chart
- Gantt Chart
- Line Chart
- Pie Chart
- Polygraphs
- Maps
- Pictograms
- Flowchart and organizational chart

We select one that best communicates Visual aids to understand for reader.

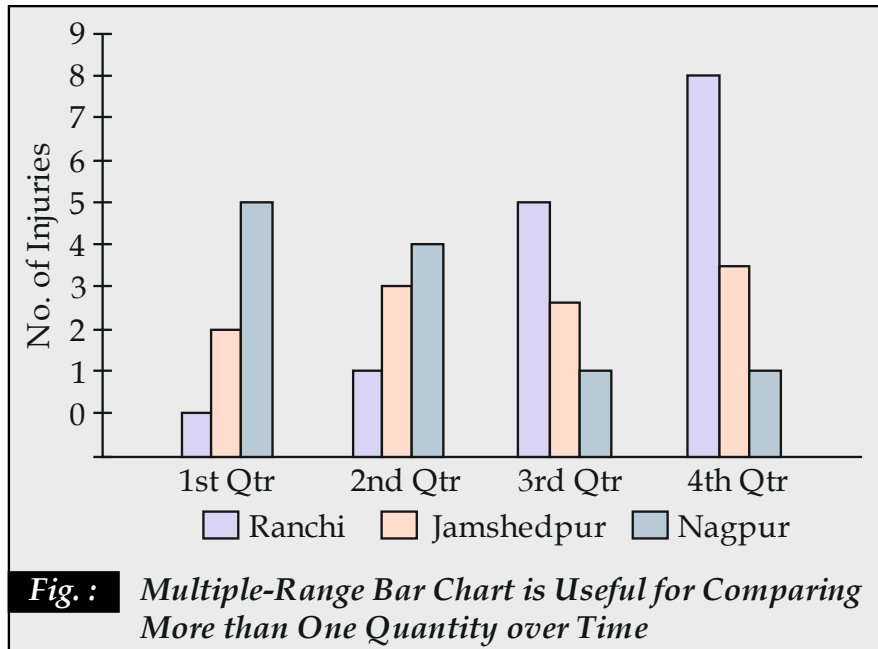
Bar Charts

The simple Bar chart (also called Single-Range bar chart) is an effective graphic device for quantities. The length of the bars whether they are horizontal or vertical, indicates quantity as shown as figure.



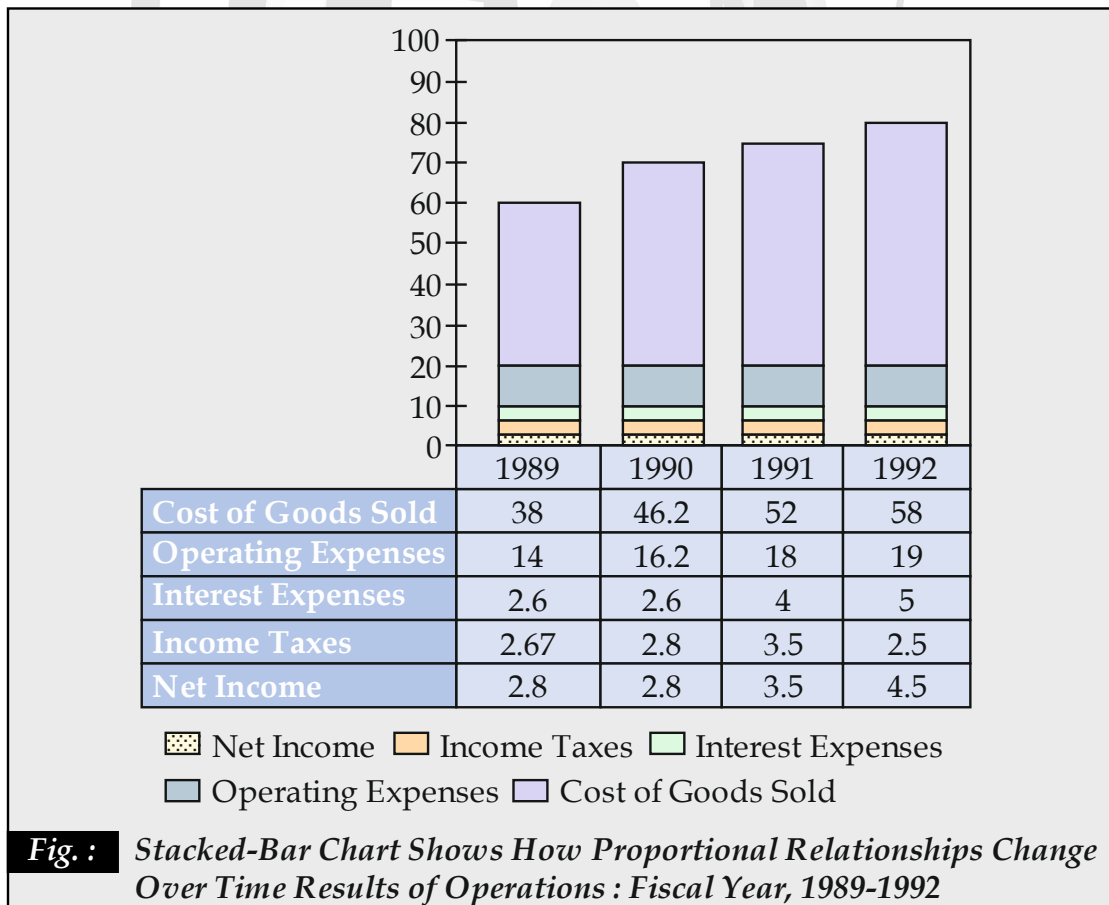
Multi Range Bar Chart

The Multi Range bar chart also called comparative or cluster bar chart is useful for expressing data that change over time, the multiple range bar chart is especially effective in comparing more than one quantity (set of data) at a point along the x-axis, figure above compare the frequency of reported injuries at three plants over an entire year



Stacked Bar Chart

The stacked -bar chart also called segment bar chart. It shows different facts (Components) contribute to a total figure. This graphics is particularly useful when components for more than one period are being compared.



Gantt Chart

Gantt chart is a type of the Bar Chart that shows the start and finish dates of several elements of the project and defining several elements of a project. A Gantt Chart is a horizontal bar chart that graphically displays time relationship. Time is displayed on the horizontal axis and tasks are shown on the vertical axis. Gantt charts were developed by mechanical engineer Henry Gantt. The reason is that they are simple and intuitive to create and use, but display a considerable amount of information at a glance.

In difficult operation we provide a useful tool for planning, allocating and schedule resources it is particularly valuable in scheduling because any graphs in a in a schedule are very conspicuous. If the operations have more than one phase a Gantt chart can be invaluable.

			PREPARADE						PARADE						GAME						PARTY			POST PARTY					
Time	24.00	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	1.00	2.00		
Unit 1	CROWD CONTROL																					CROWD CONTROL							
Unit 2					CROWD CONTROL																								
Unit 3														CROWD CONTROL			CROWD CONTROL												
Unit 4					TRAFFIC CONTROL				CROWD CONTROL																				

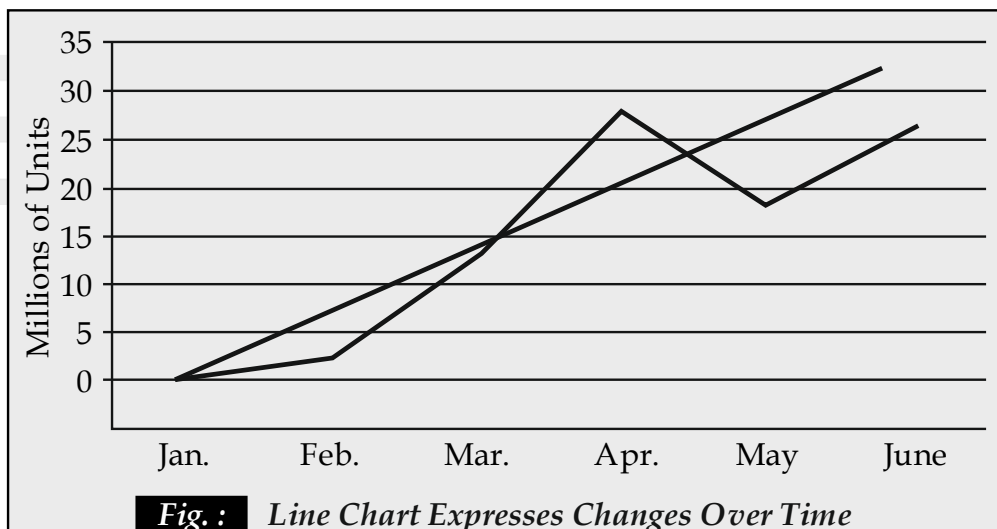
Fig. : Gantt Chart for Scheduling Activities Schedule of Duties for New Year's Day Festivities

Line Chart

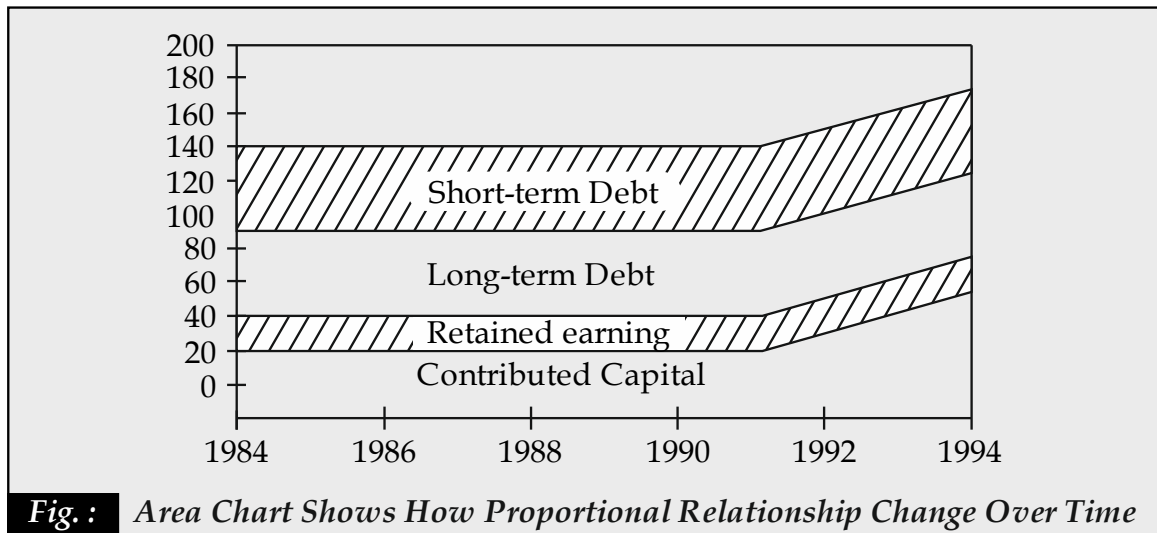
Line chart show only the total amount for a time period. It indicates the variation of a quantity with respect to two parameters calibrated on X-axis and Y-axis parameters. These are very useful for determining the trends and rates of changes.

When constructing line chart follow general guideline.

- Use the vertical axis for amount and the horizontal axis for time.
- Begin the vertical axis at zero.
- Divide the vertical and horizontal scales into equal increments.



Northridge Industries : Budgeted and Actual Sales Volume Six Months Ended June 30, 1993



Pie Chart

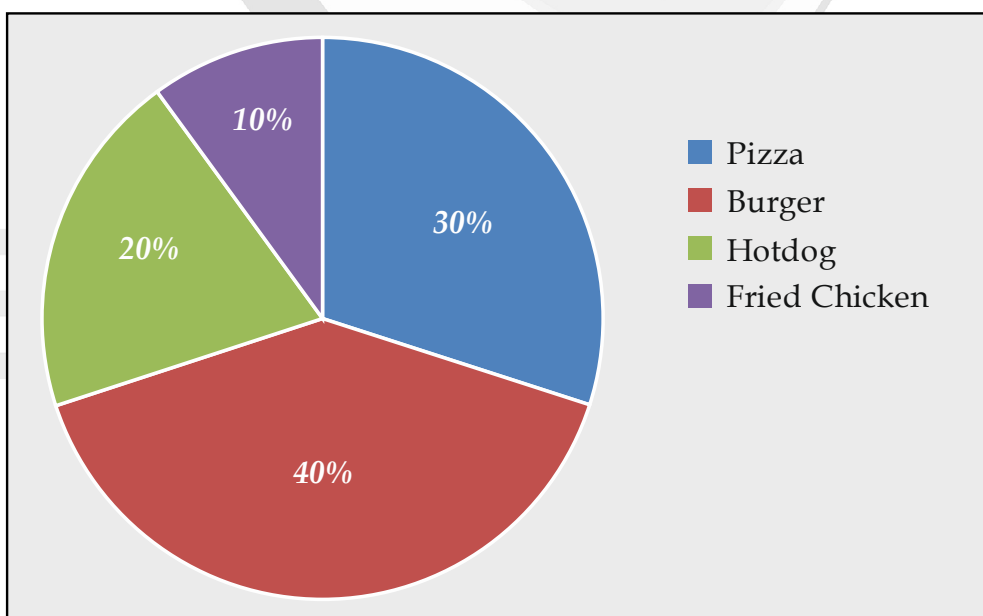
As the name indicates, the whole is represented as pie, with the parts becoming Slices of the pie. Pie charts are effective for showing percentage (parts of a whole) but they are ineffective in showing quantities totals or comparisons.

We draw a circle of any radius to represent the data by a pie chart. The total angle at the centre of the circle is 360°.

The following formula can be used to calculate the angle of each item.

$$\text{Angle of item} = \frac{\text{Frequency of data}}{\text{Total Frequency}} \times 360^\circ$$

Angles in the circle may be organised in increasing or decreasing. Various sectors of pie diagrams should be coloured or shaded in different pattern.



Polygraph

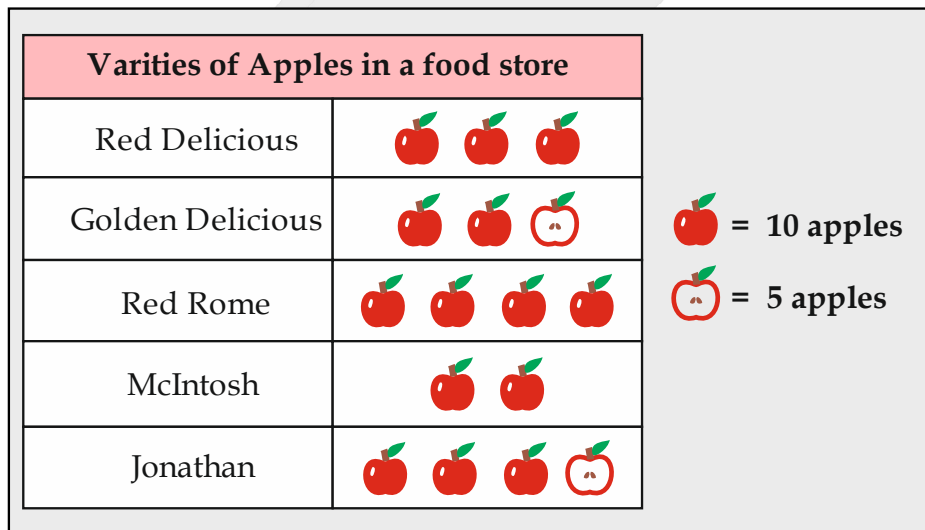
Poly graph is a line graph in which two or more than two variables are shown on a same diagram by different lines. It helps comprising the data such as growth rate of GDP, sex ratio, death rates and life expectancy.

Pictograms

Pictograms use Pictures to illustrate numerical relationship. It is a way of representing statistical data using symbolic figures to match the frequencies of different kinds of data. It is necessary to insure that all symbols are of same size so that true relationships are not distorted.

For Example

The pictograph shows the number of varieties of apples stored at a supermarket.





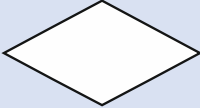


Flow Chart and Organization Chart

A flowchart and organization chart is a powerful business tool. With proper design and construction, it communicates the steps in a process very effectively and efficiently. If we need to show physical or conceptual Relationships rather than numerical information. We might want to use a flow chart or an organization chart.

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Flow Chart Symbols

Symbol	Name	Function
	Start/end	An oval represents a start or end point
	Arrows	A line is a connector that shows relationships between the representative shapes
	Input/Output	A parallelogram represents input or output
	Process	A rectangle represents a process
	Decision	A diamond indicates a decision

Maps

Maps help readers visualize geographic relationships which useful provide information about location of home, office, retail stores, within geographically region.

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